A319/A320/A321
TECHNICAL TRAINING MANUAL
SA Family to A319/A320/A321 CFM LEAP - T1+T2
26-FIRE PROTECTION

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Fire Protection System Component Location.....2

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

SYSTEM OVERVIEW

The engine and APU fire protection is done by two sub-systems: the FIRE detection system and the FIRE extinguishing system.

ENGINE AND APU FIRE PROTECTION (CEO)

The engines and the APU have individual fire detection systems.
Each system has two identical detection loops (A and B) installed in parallel. Each loop includes 3 detector elements.
These detection elements are located around the Accessory Gear Box (AGB), Core engine area and pylon area.
The two loops are monitored by a Fire Detection Unit (FDU). FDU 1 monitors the loops on engine 1 and FDU 2 monitors the loops on engine 2.
The FDU sends FIRE and FAULT signals to the Flight Warning Computer (FWC) for display on ECAM.
The APU has two identical loops (A and B) installed in parallel on the APU compartment. These loops are monitored by FDU APU.
The guarded FIRE P/B switches give FIRE indication and are used to isolate the related systems. When the FIRE pushbutton is released out, the engine or APU will shut down. This also arms the extinguishing system.
Each engine has 2 fire bottles installed in the pylon.
The discharge of each bottle is controlled by a related AGENT P/BSW on the FIRE panel.
For the APU, there is only one fire extinguisher bottle, which is installed in the aft fuselage forward of the APU firewall. Its discharge is controlled by one AGENT P/BSW. On the ground, an APU FIRE will cause an automatic shutdown of the APU and an automatic discharge of the bottle.
The TEST buttons are used to do tests on the different fire detection and extinguishing systems and make sure they operate correctly.

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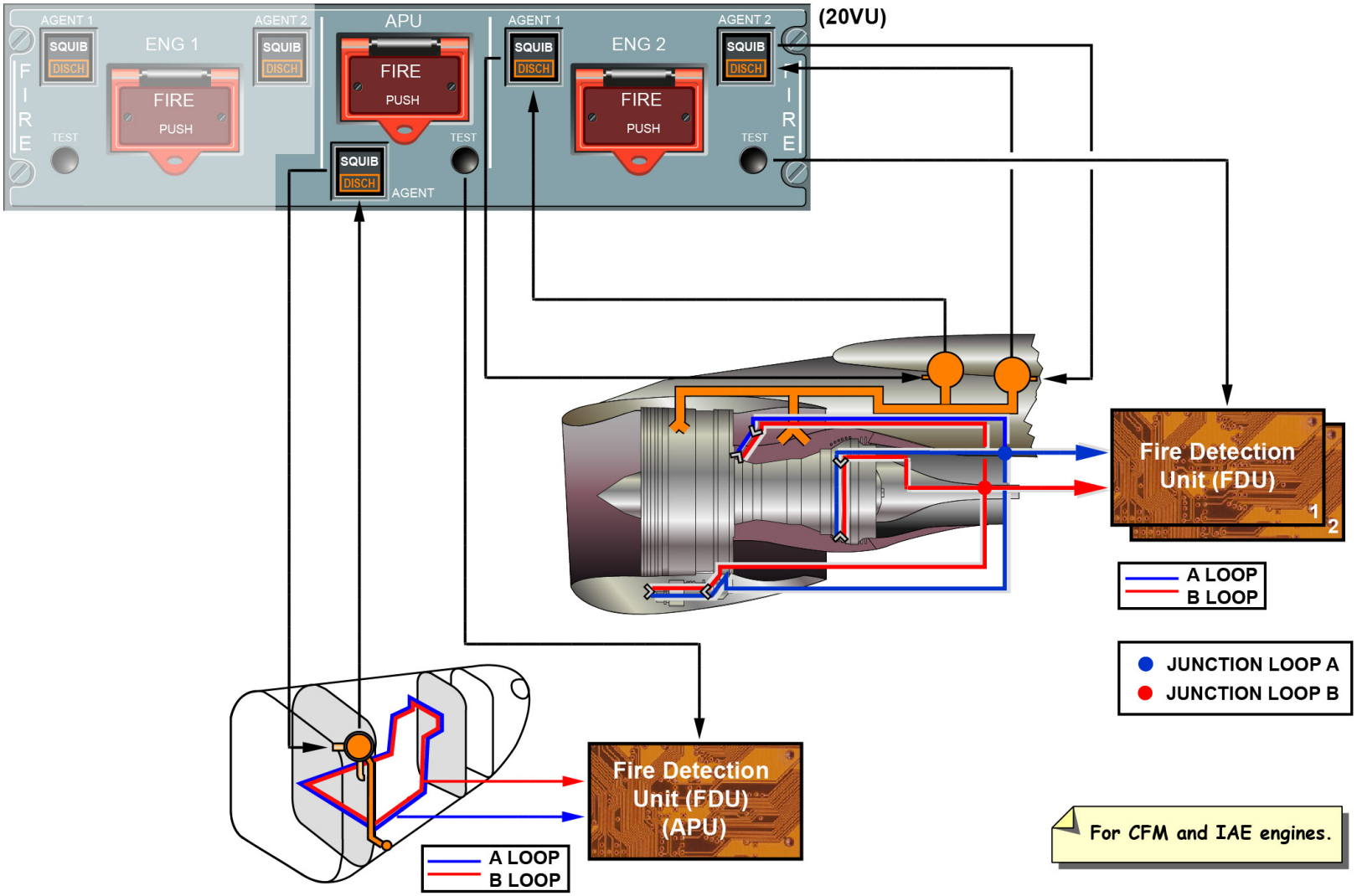

SYSTEM OVERVIEW - ENGINE AND APU FIRE PROTECTION (CEO)

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

SYSTEM OVERVIEW (continued)

ENGINE AND APU FIRE PROTECTION (PW1100)

For Pratt and Whitney (PW) 1100G engine, the accessory gear box is located in the Core engine area.
The PW has 3 fire detectors (pylon, AGB and core).
The fire detection and extinguishing principle is identical on all Single Aisle family.

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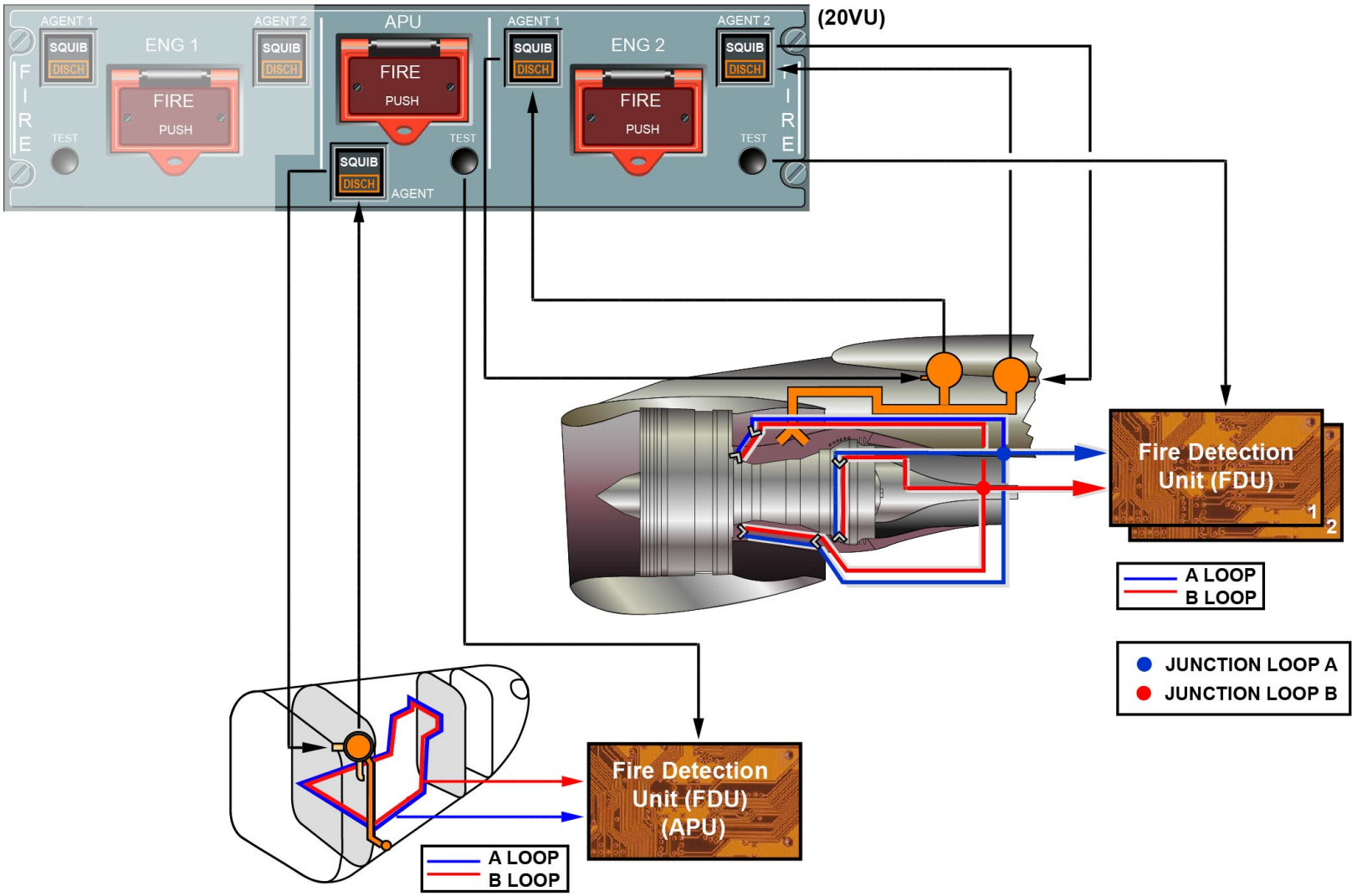

SYSTEM OVERVIEW - ENGINE AND APU FIRE PROTECTION (PW1100)

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

SYSTEM OVERVIEW (continued)

ENGINE AND APU FIRE PROTECTION (CFM LEAP)

The CFM Leap has 4 detectors (pylon, fan, AGB and core).
The fire detection and extinguishing principle is identical on all Single Aisle family.

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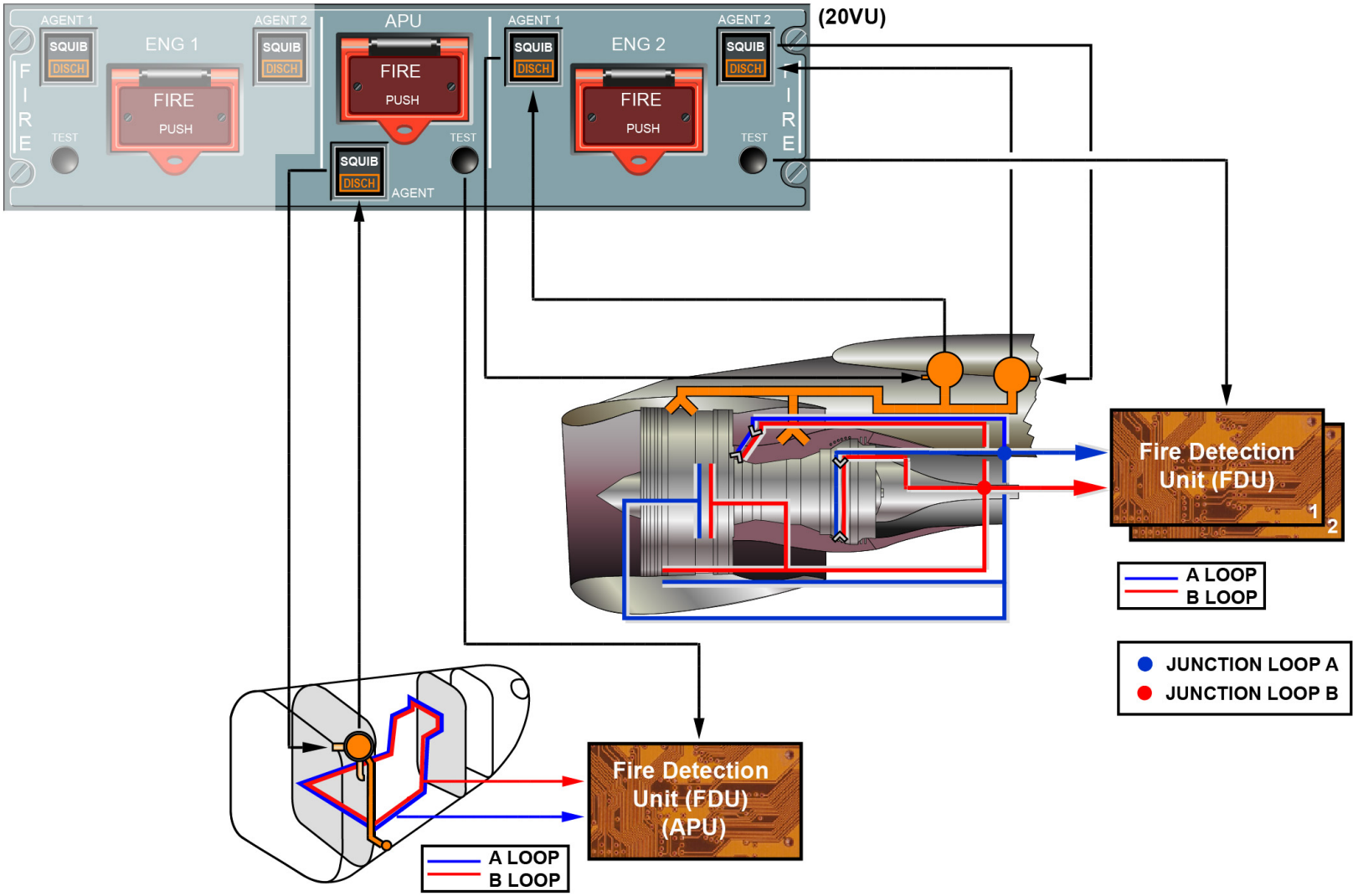

SYSTEM OVERVIEW - ENGINE AND APU FIRE PROTECTION (CFM LEAP)

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

SYSTEM OVERVIEW (continued)

AVIONICS SMOKE DETECTION

The A320 family aircraft have a cooling system for the avionics equipment. The cooling system is controlled and monitored by the Avionics Equipment Ventilation Controller (AEVC). The circulation of the air through the system is supplied by a blower fan (cool air supply) and an extraction fan (warm air removal).
The extraction airflow is downstream of the avionics equipment. The avionics SMOKE detector, which is installed in the extraction duct, is used for the detection of smoke from the computers and control boxes. The detector is monitored by the AEVC. The smoke detector directly sends the signal to FWC for the AVIONICS SMOKE warning in the cockpit.

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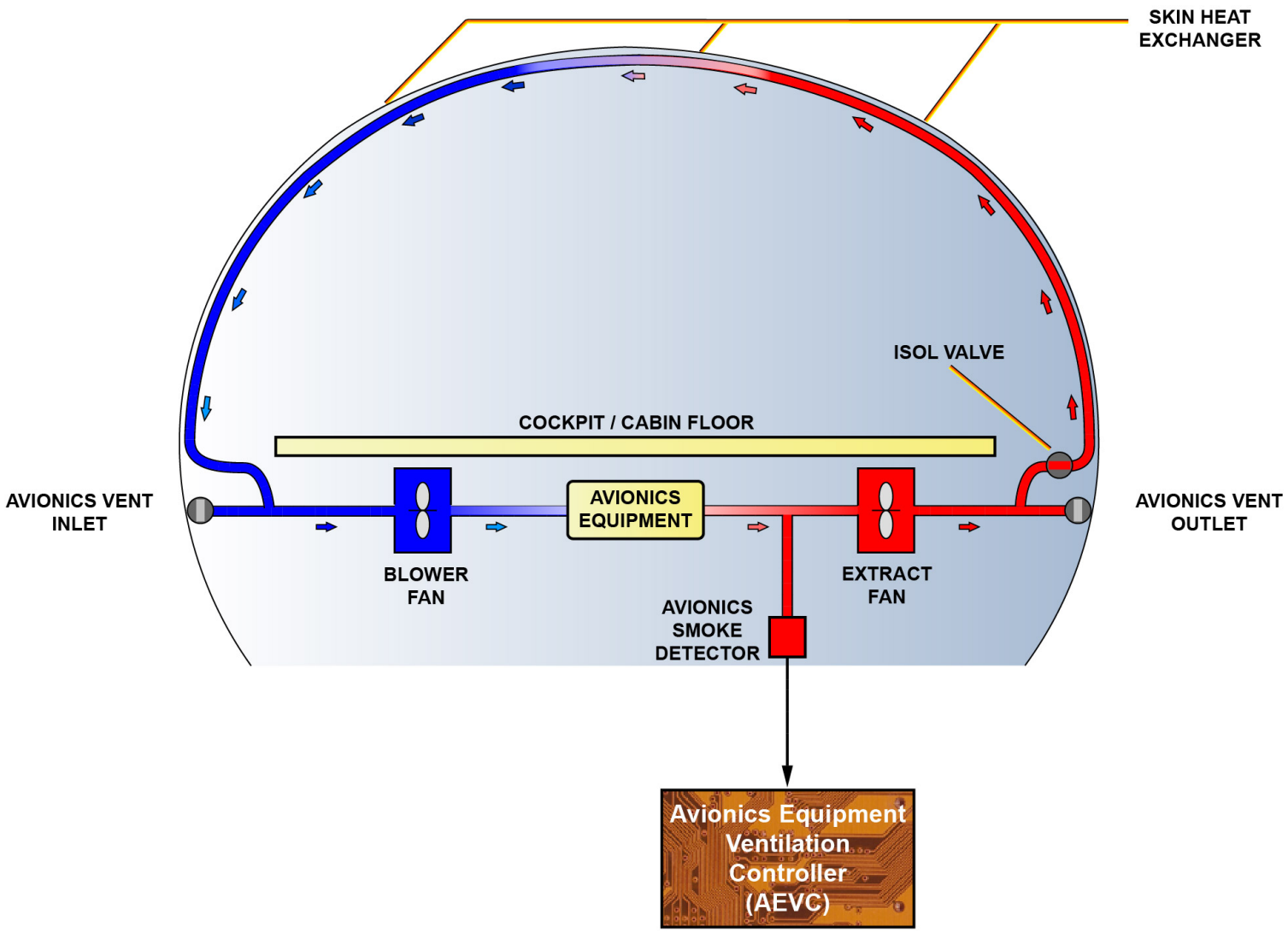

SYSTEM OVERVIEW - AVIONICS SMOKE DETECTION

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

SYSTEM OVERVIEW (continued)

CARGO SMOKE DETECTION

The cargo compartment smoke detection system is monitored by the Smoke Detection Function (SDF) integrated in the Cabin Intercommunication Data System (CIDS). The CIDS-SDF receives signals from the cargo detectors and sends SMOKE or FAULT warnings to the Flight Warning Computer (FWC) to give an alert to the flight crew.

CARGO FIRE EXTINGUISHING

The cargo compartment fire-extinguishing agent is discharged into the FWD compartment through one nozzle (2 nozzles for A321) or into the AFT compartment through two nozzles (3 nozzles for A321). The standard system includes one extinguishing bottle in the FWD cargo compartment (or in the AFT bulk cargo compartment, RH side, for A318 and A319). For the A320, the extinguishing bottle can also be in the AFT cargo compartment.
An optional system includes two bottles. The second bottle can be used for large range operations.

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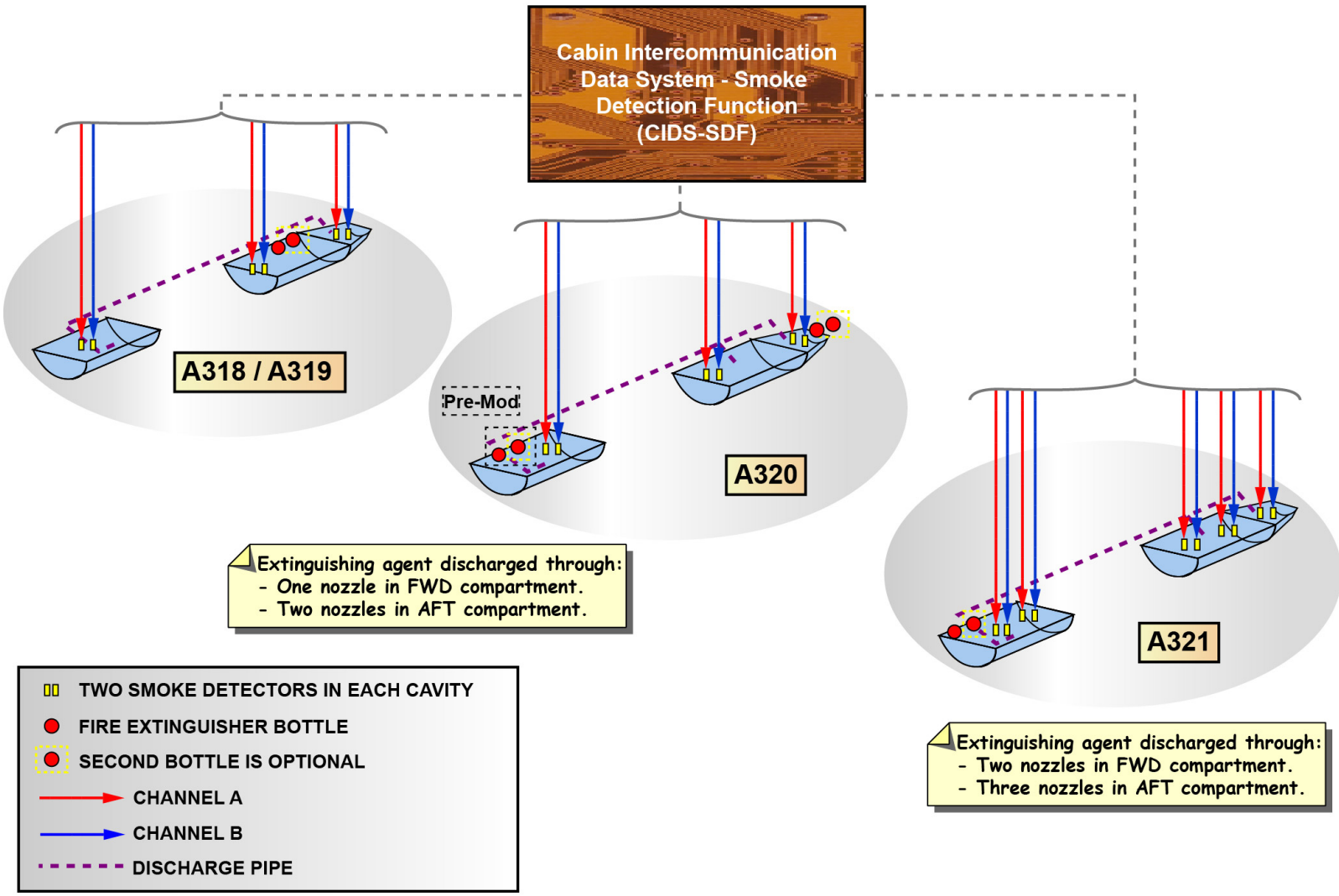

SYSTEM OVERVIEW - CARGO SMOKE DETECTION & CARGO FIRE EXTINGUISHING

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

SYSTEM OVERVIEW (continued)

LAVATORY SMOKE DETECTION AND EXTINGUISHING

The lavatory smoke detection system is monitored by the SDF integrated in the CIDS. The CIDS-SDF receives signals from the lavatory detectors and sends SMOKE or FAULT warnings to the FWC to give an alert to the flight crew.
The protection of each lavatory waste bin is done by an automatic fire extinguishing system. A small pressurized extinguisher will automatically discharge if there is a fire. The fusible material in the discharge tube melts at high temperature and the pressurized agent is discharged into the waste bin.
LAV SMOKE warnings are also sent to the CIDS to give an alert to the cabin crew.

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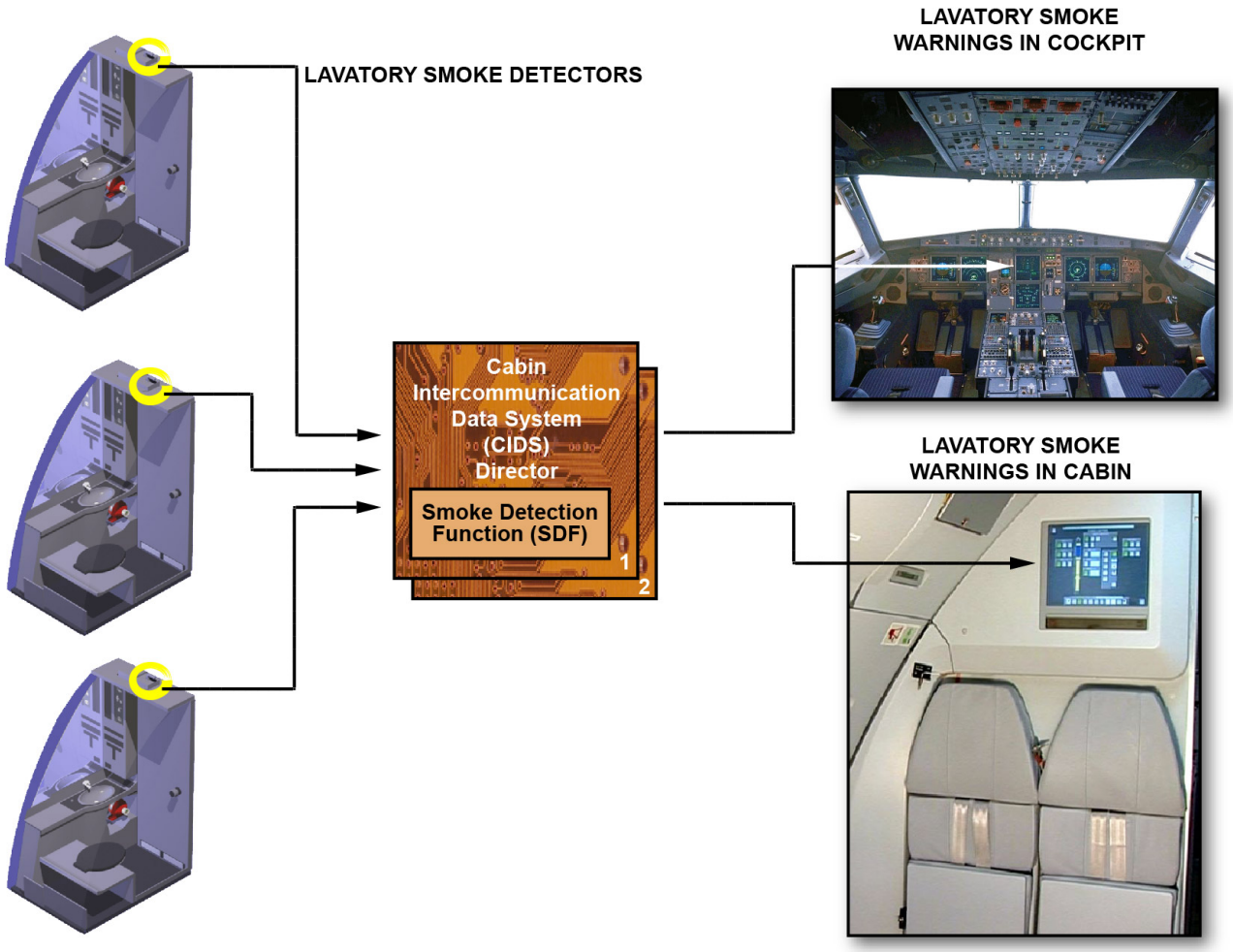

SYSTEM OVERVIEW - LAVATORY SMOKE DETECTION AND EXTINGUISHING

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION

ENGINE FIRE DETECTION (CEO)

Each fire detection loop contains 3 detector elements connected in parallel.
The fire detectors are located:
- one around the AGB,
- one in the Core compartment (270 to 330 degrees) between the fuel nozzles and the aft circumferential ventilation outlet,
- one protecting the pylon above the combustion chamber.

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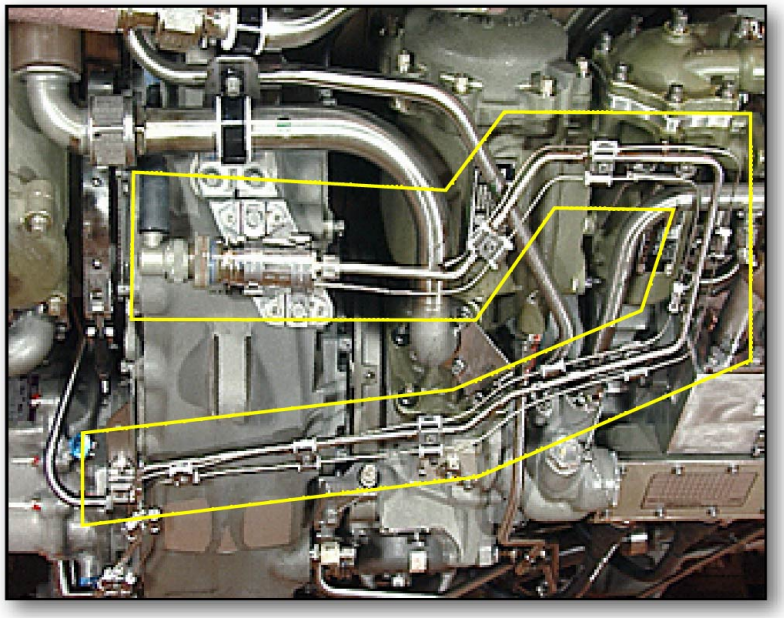
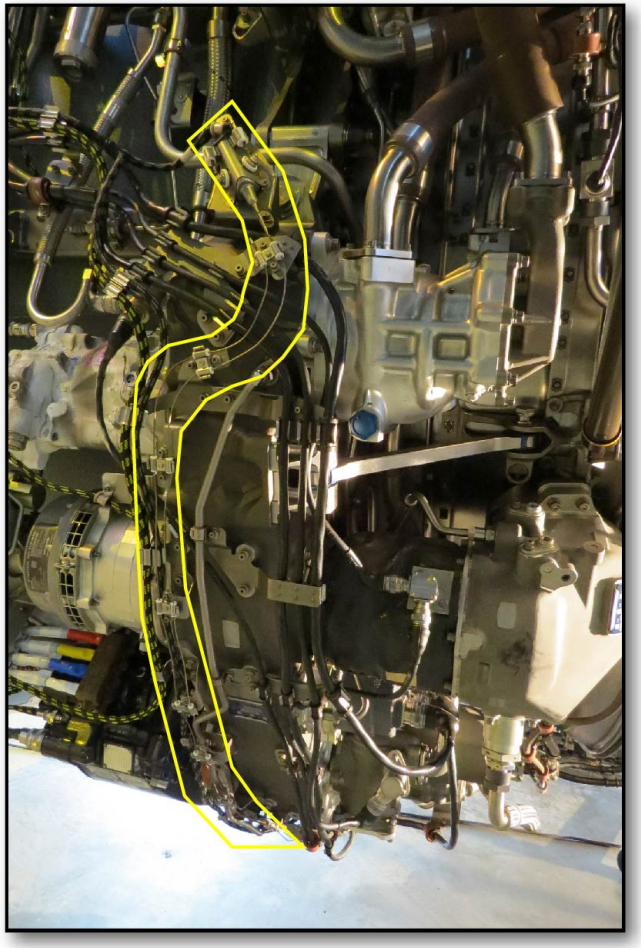


CFM56 FAN FIRE DETECTORS



IAE V2500 AGB FIRE DETECTORS

COMPONENT LOCATION - ENGINE FIRE DETECTION (CEO)

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION (continued)

ENGINE FIRE DETECTION (NEO)

Each fire detection loop contains 3 detector elements connected in parallel except for Leap there are 4.
For all engines installation, there is a detection at the pylon, the engine core and around the accessory gearbox.
The FDUs are located in the avionics compartment under the 80VU rack.
The 3 PW fire detectors are located:
- around the AGB,
- in the Core compartment (270 to 330 degrees) between the fuel nozzles and the aft circumferential ventilation outlet,
- at the pylon above the combustion chamber.

The 4 CFM Leap detectors are located:
- around the AGB,
- around ventilation exit grid of the fan compartment,
- around turbine,
- at the pylon (above the combustion chamber).

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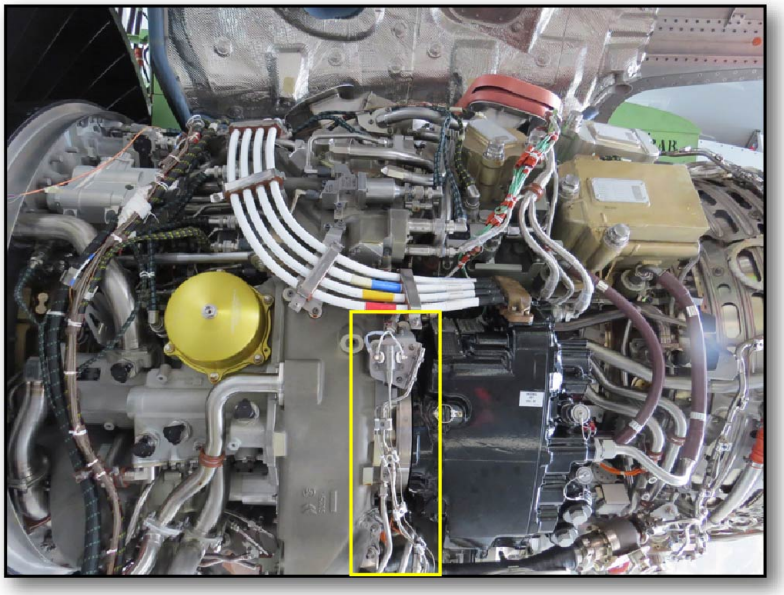
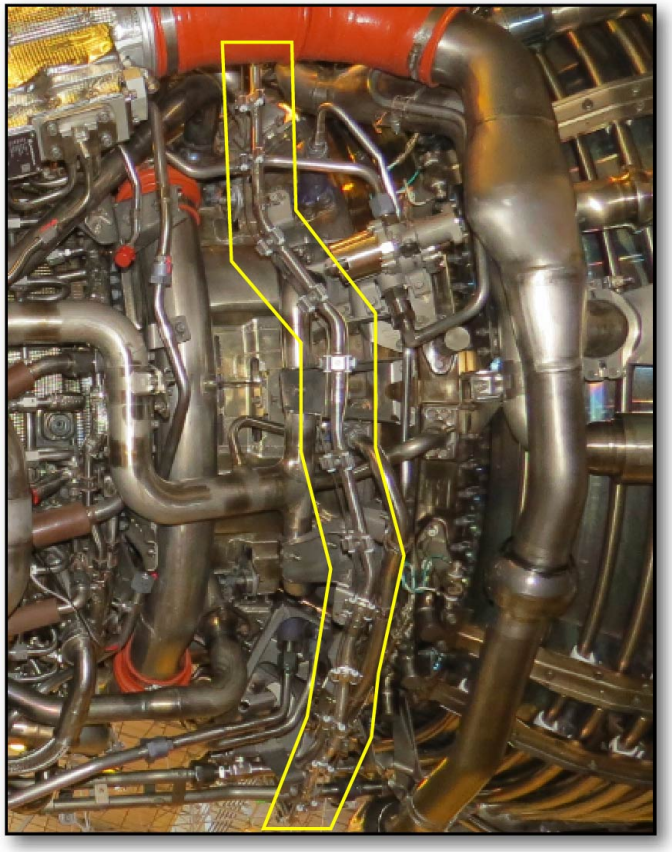


PW1100G AGB FIRE DETECTORS



CFM LEAP - TURBINE AREA FIRE DETECTOR

COMPONENT LOCATION - ENGINE FIRE DETECTION (NEO)

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION (continued)

ENGINE FIRE EXTINGUISHING

The engine fire extinguishing bottles are in the pylon. There are access panels on the two sides of the pylon.

NOTE: Note: Bottles for all CFMs and IAE V2500 have the same size but the Leap one has a different part number.
The PW ones are smaller.

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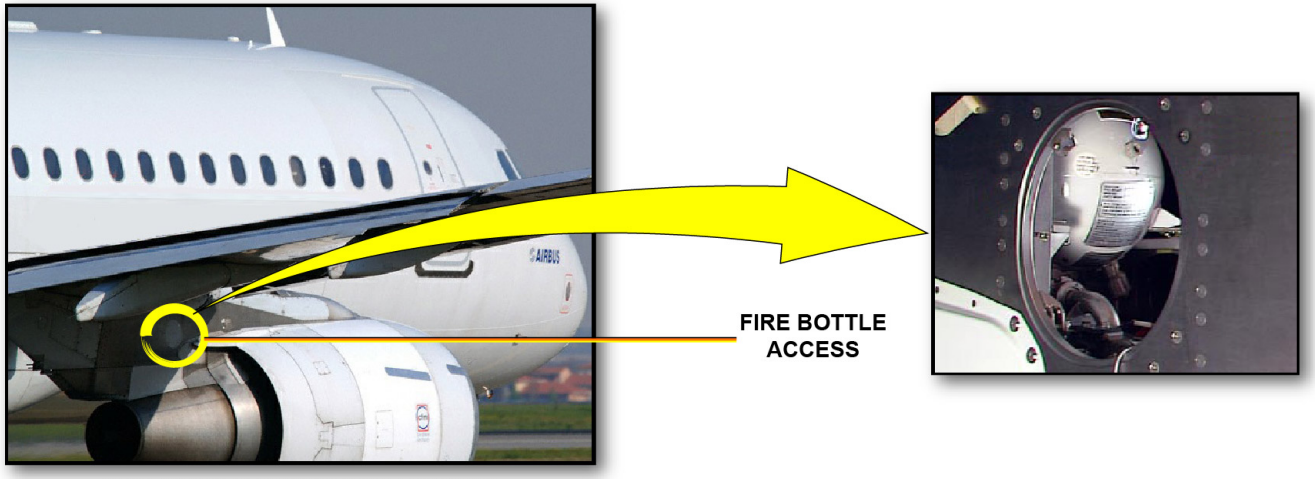
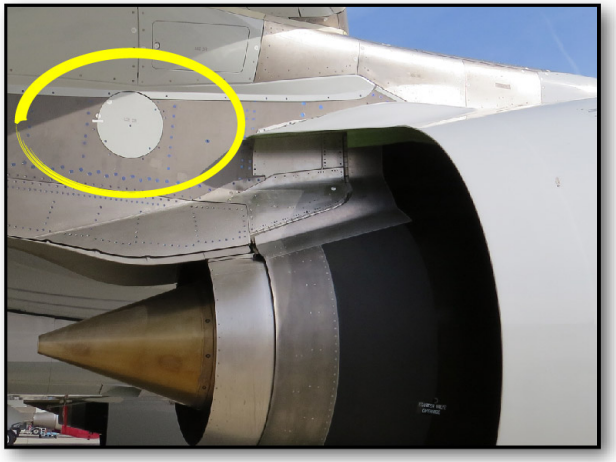


CEO AIRCRAFT WITH CFM ENGINES



NEO AIRCRAFT WITH PW1100G ENGINES

NEO AIRCRAFT WITH LEAP ENGINES

COMPONENT LOCATION - ENGINE FIRE EXTINGUISHING

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION (continued)

APU FIRE DETECTION AND EXTINGUISHING

Each APU fire detection loop is a single detector element installed around the interior of the APU compartment.
The APU fire extinguishing bottle is in the aft fuselage forward of the APU firewall. There is an access panel on the lower fuselage.

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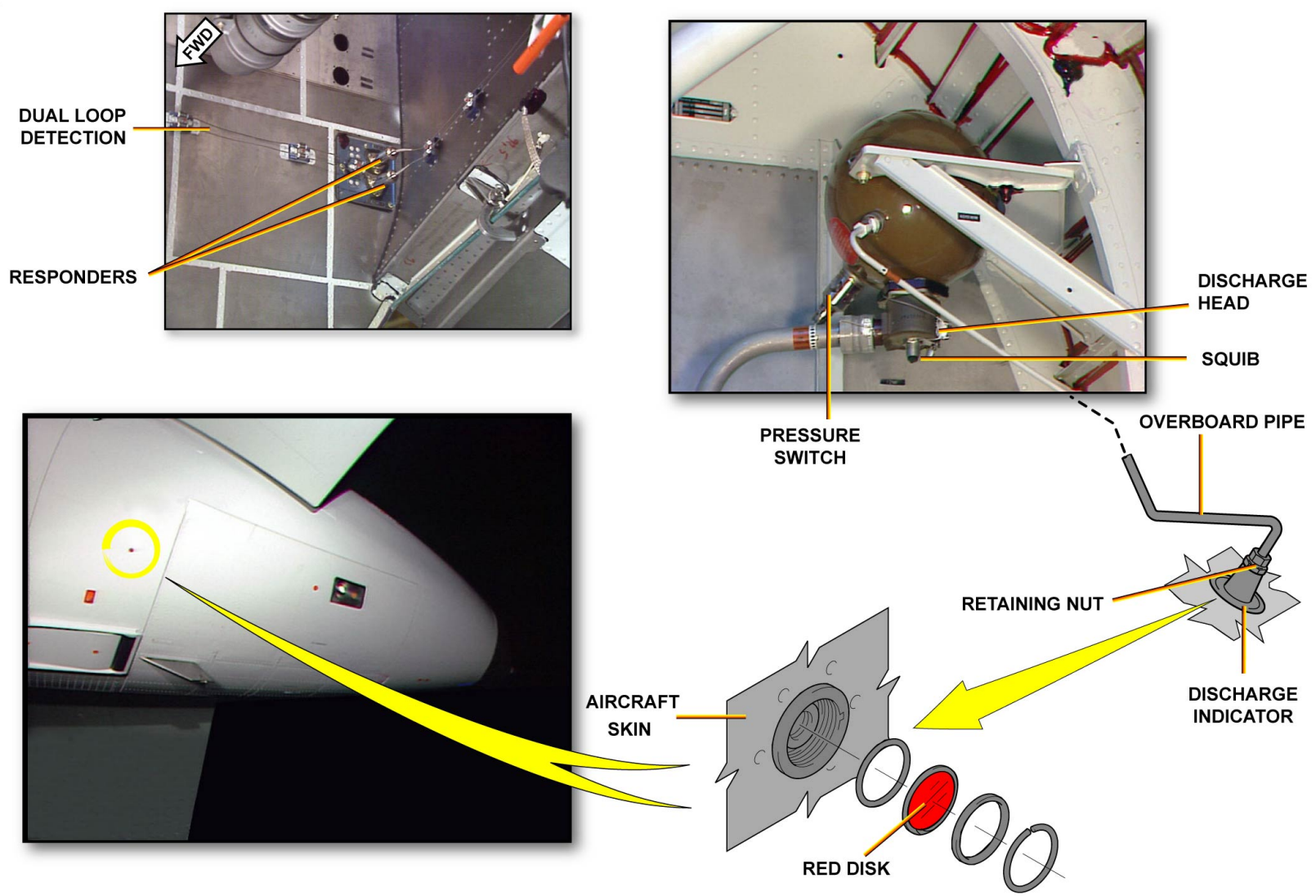

COMPONENT LOCATION - APU FIRE DETECTION AND EXTINGUISHING

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION (continued)

AVIONICS SMOKE DETECTION

There is only one avionics smoke detector, which is in the avionics compartment in the ventilation extraction duct.

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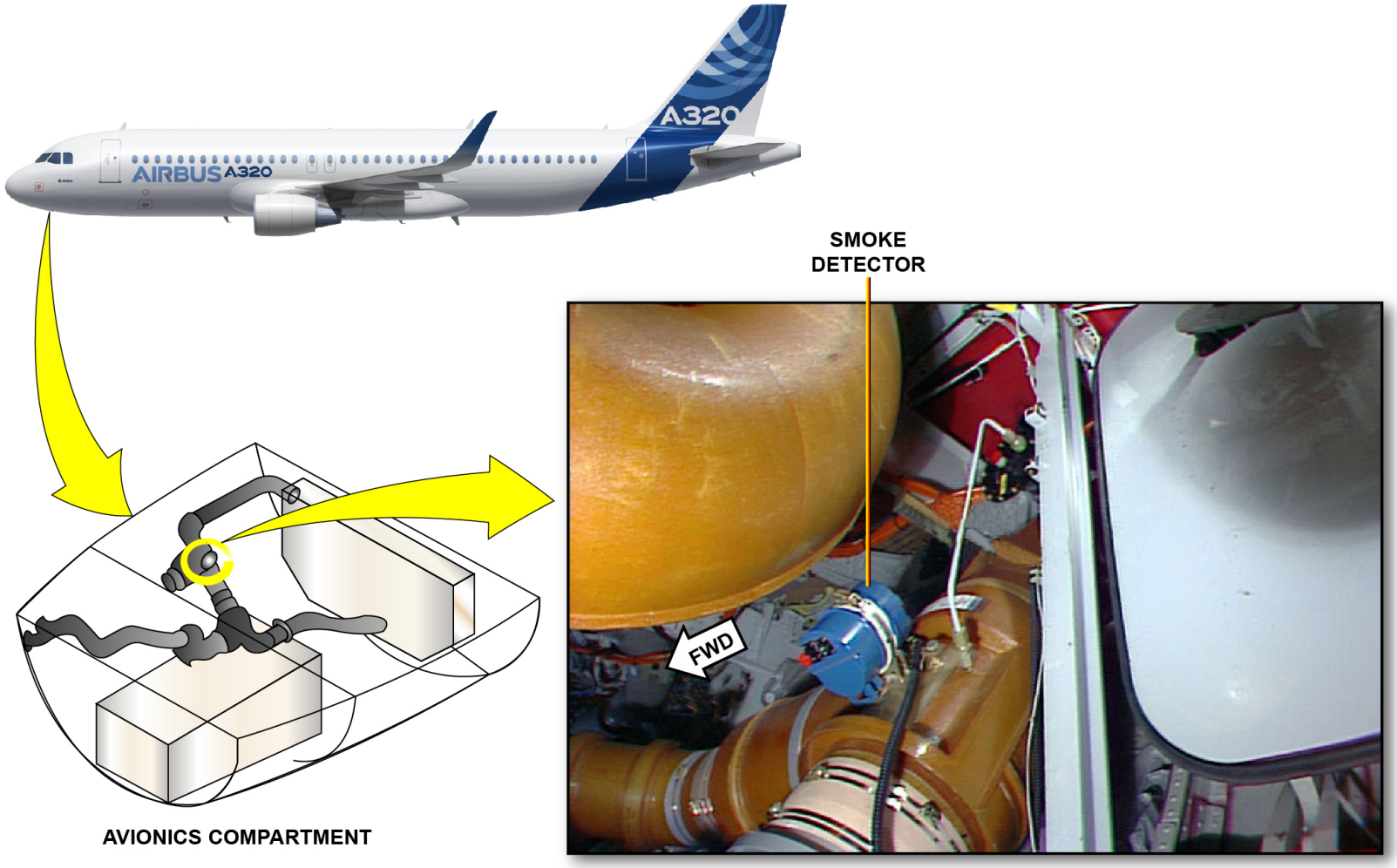

COMPONENT LOCATION - AVIONICS SMOKE DETECTION

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION (continued)

CARGO COMPARTMENT FIRE DETECTION AND EXTINGUISHING

Each cargo compartment has 2 smoke detectors in each cavity. The smoke detectors are installed in recessed panels in the compartment ceiling.

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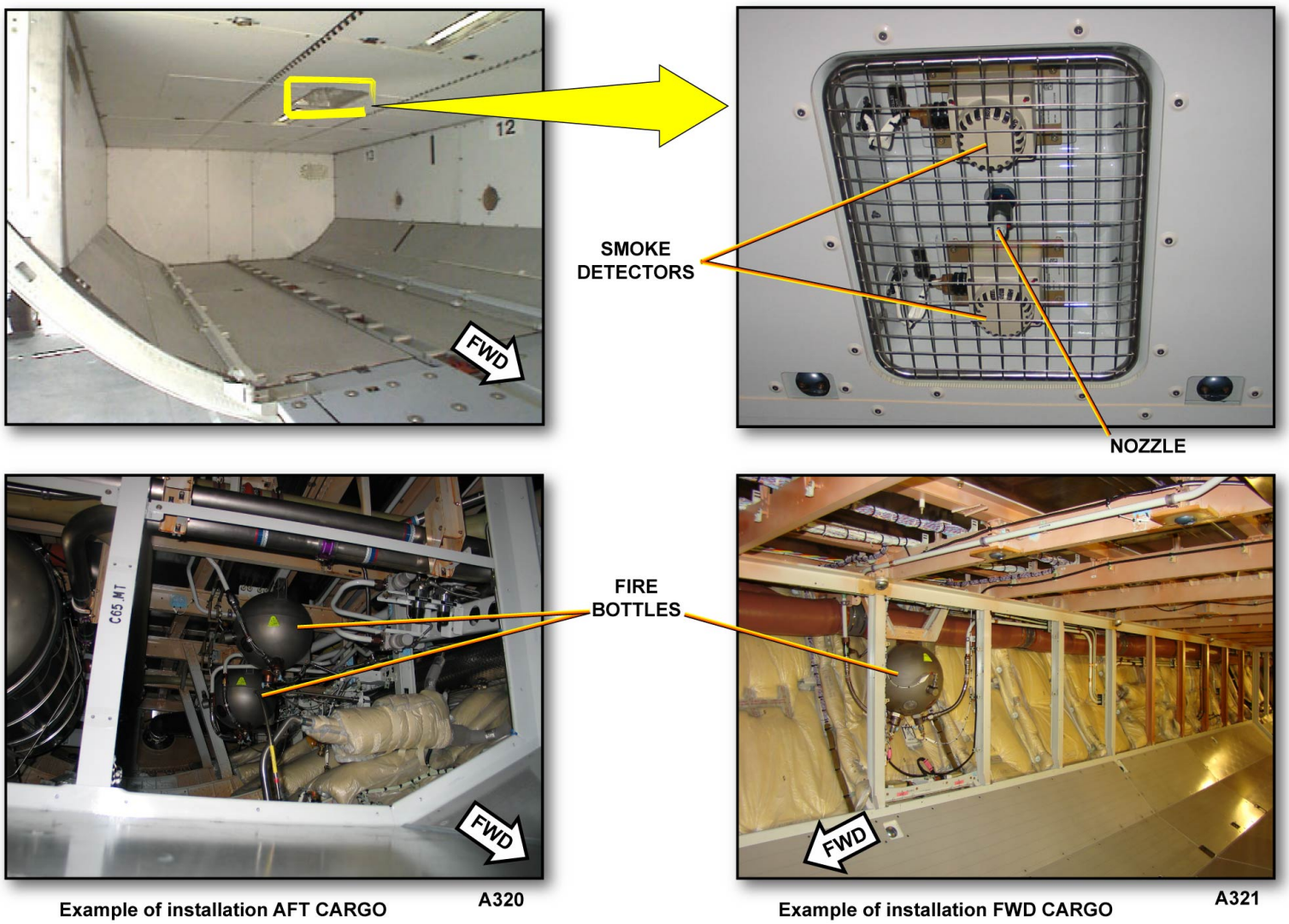

COMPONENT LOCATION - CARGO COMPARTMENT FIRE DETECTION AND EXTINGUISHING

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FIRE PROTECTION SYSTEM COMPONENT LOCATION

COMPONENT LOCATION (continued)

LAVATORY SMOKE DETECTION AND EXTINGUISHING

Each lavatory has only one smoke detector, installed in the air extraction duct in the lavatory ceiling.
A fire extinguisher is located above the waste bin in each lavatory service cabinet.

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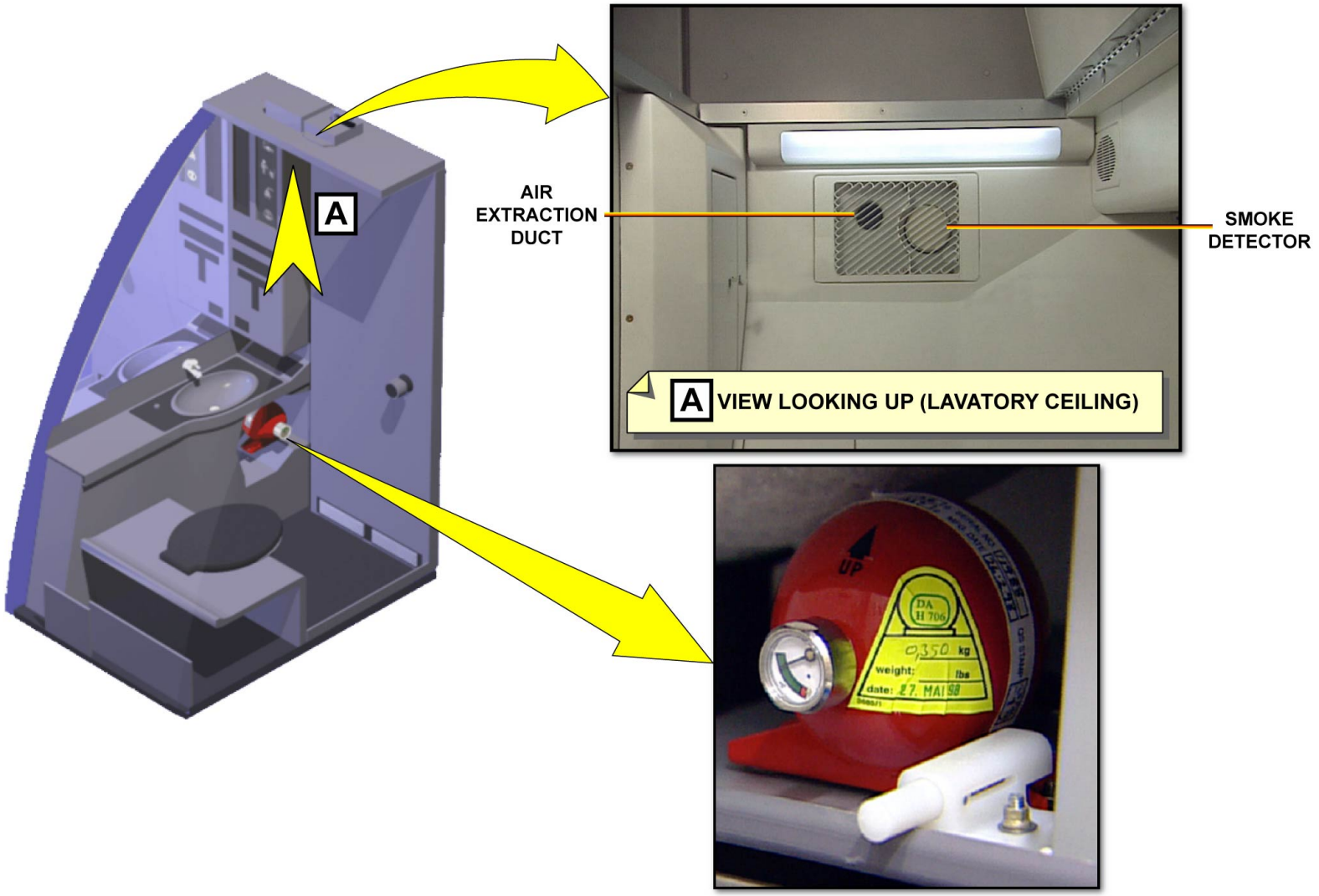

COMPONENT LOCATION - LAVATORY SMOKE DETECTION AND EXTINGUISHING

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